

**RESPONSE TO DR. BRADLEY'S ANALYSIS OF THE RACIAL
COMPOSITION OF ASHLAND LABORER HIRES
PRESENTED IN HIS REBUTTAL REPORT**

Mary Dunn Baker, Ph.D.¹
ERS Group
Tallahassee, Florida
August 1, 2005

In his July 6, 2005 Rebuttal Expert Report, Dr. Bradley presents additional analyses of the racial composition of Laborer hires at AK Steel's Middletown and Ashland Works over the period 1/1/2000 - 12/31/2003. In the Ashland analysis described therein, Dr. Bradley used an African-American availability rate of 8.56%.² He derived this benchmark using the AK Steel Ashland Data ["Ashland App Flow (no ssn) (W0377464).xls"] (applicant log) which is the first electronic file containing Ashland applicant data that was produced in discovery in this case. This applicant log includes *some* Ashland application and hiring data for the period 10/24/2000 - 9/17/2002 (only part of the time period included in Dr. Bradley's studies) and contains 696 records. After records for applicants of unknown race are removed and each applicant is counted only

¹ My credentials are outlined in my May 25, 2005 report and are not repeated here. ERS Group (ERS) continues to charge \$350 per hour for the time that I spend on this project and \$90-\$300 per hour for the services that my staff provides.

² The Ashland analysis in Dr. Bradley's Rebuttal Report differs from the Ashland analysis in his Supplemental Report (April 18, 2005) only in the number of Laborer hires analyzed. In the Supplemental Report, Dr. Bradley analyzed 77 Ashland Laborer hiring decisions that were made over the period 10/24/2000 - 9/17/2002. In the Rebuttal Report, Dr. Bradley analyzed 289 Ashland Laborer hiring decisions made over the period 1/1/2000 - 12/31/2002.

once (regardless of the number of applications the individual submitted), 585 records remain, 8.56% of which are for African-American applicants.

Subsequently, AK Steel produced another database [Ashland Summation database (W0425161)] (Summation database) constructed from imaged application forms and other relevant documents which includes information from a much larger number of applications for Ashland Laborer jobs than the applicant log contains.³ The Summation database contains 3,736 records for the period 1/1/2000 -12/31/2003, while the applicant log includes only 696. Using the Summation database and additional information obtained from AK Steel,⁴ ERS constructed an analytic file to prepare statistical analyses of the racial composition of Ashland hires. The Baker Ashland Data (Baker file) contains 3,743 applications, 2,760 for which race is known.⁵

The Baker file did *not* include records from the applicant log because of its numerous and obvious flaws. For example, a comparison of the log with the Ashland list of Laborer hires (which was in Dr. Bradley's possession at the time that he prepared the Rebuttal Report) reveals that 43 of the individuals who applied during the time period that the log covered (10/24/2000 - 9/17/2002) and who were hired as Laborers do not have a record in the log. Also, 16 of the 77 individuals identified by the log as Ashland Laborer hires were actually hired into non-laborer positions. Furthermore, a comparison of the names in the applicant log with the Summation database (constructed from images

³ Dr. Bradley had access to the Ashland Summation database prior to the submission of his Supplemental Report (April 18, 2005).

⁴ Information about seven Laborer hires was added to the Ashland Summation Database.

⁵ The Baker Ashland Data includes 210 unique applicants who were selected for non-laborer (or craft) jobs at Ashland during the period 1/1/2000 - 12/31/2003. My understanding is that applicants who were hired into craft positions were not considered for Laborer jobs. Therefore, craft hires should not be included in analyses of Laborer hires. [Dr. Bradley includes craft hires as unsuccessful applicants in the analysis of Ashland Laborer hires presented in his Rebuttal Report.] However, unsuccessful applicants for craft jobs were eligible for consideration for Laborer jobs and are properly included in analyses of Laborer hires.

of Ashland employment applications) reveals that Ashland received applications from approximately 1,200 individuals whose names do not appear on the log at all. Moreover, the records in the applicant log that did not appear in the Summation database could not be verified against application forms or other relevant documents.⁶ Therefore, confirmation that these individuals, in fact, applied for Laborer jobs could not be obtained. In sum, ERS did not use the applicant log data because it is so flawed that it cannot, in good conscience, be used to establish a benchmark.

The Baker file includes information for 3,059 unique individuals who applied during the period 1/1/2000 - 12/31/2003 and who were not hired into non-Laborer jobs. Race is known for 2,156 (70.5%) of these individuals. The percent African-American among the 2,156 individuals of known race is 3.43%, or 5.1 percentage points lower than the benchmark that Dr. Bradley used (8.56%).⁷

Although Dr. Bradley had access to the Summation database prior to the submission of his Supplemental Report (April 18, 2005) and was in possession of the Baker file at the time that he prepared his Rebuttal Report, he relied exclusively on the applicant log to measure African-American availability for Ashland Laborer jobs, despite the fact that it is grossly incomplete and has numerous and obvious flaws. According to his Rebuttal Report, he relied on the applicant log rather than the Baker file because the percent of applicants of unknown race is only 6.4% in the applicant log versus more than 28% in the Baker file.⁸ In my opinion, Dr. Bradley should not have ignored the race data

⁶ The applicant log includes information for 170 unique individuals who do not have a record in the Summation database. The race of 155 of these applicants is known. Information about 455 individuals (430 of known race) is found on the applicant log and in the Summation database.

⁷ If hires into craft jobs are included (although they should not be), there are 3,268 unique applicants, 2,341 for whom race is known. The percent African-American among the individuals of known race is 3.20% (75/2,341), or 5.4 percentage points lower than the availability rate that Dr. Bradley used.

⁸ See page 9 of Dr. Bradley's Rebuttal Report.

for approximately 1,900 individuals whose data do not appear on the log, but who do have records in the Summation database, because these individuals did, in fact, apply for, and were considered for, Ashland Laborer jobs. To ignore any applicants for Laborer jobs whose race is known simply because the information is provided in a file that has a higher incidence of unknown race than another file is not appropriate.

If Dr. Bradley insists that the likely percent African-American among applicants of unknown race is 8.56% because the incomplete and otherwise flawed applicant log shows that this is the percent African-American among 585 people, then he could have constructed a benchmark by using the available race information in the Baker file and assuming that 8.56% of all individuals of unknown race who have records in this file are African-Americans. For the time period that Dr. Bradley studied, 1/1/2000 - 12/31/2003, there are 903 individuals of unknown race. If Dr. Bradley's 8.56% estimate of the percent African-American among applicants of unknown race is applied, then the expectation is that 77 of these 903 applicants are African-Americans. As there are 74 African-Americans of known race in the Baker file and the estimated number of African-Americans among applicants of unknown race is 77 (903×0.0856), the total estimated number of African-American applicants over this three year period is 151. The total number of unique applicants in the Baker file for the time period that Dr. Bradley studied is 3,059. Therefore, the availability rate based on all of the verifiable known race data and Dr. Bradley's estimate of the percent African-American among applicants of unknown race is 4.94%. This representation rate is 3.62 percentage points lower than the rate that Dr. Bradley used.

If Dr. Bradley had not ignored the race data provided in the Baker file and he constructed a proxy benchmark using the method described above, an analysis of the Ashland hires like the one that he presents at Table 3 in his Rebuttal Report would yield a statistical expectation of approximately 14 ($289 \times 0.0494 = 14.3$) African-American hires. His analysis shows that 12 African-Americans were selected for Ashland Laborer positions during the period that he studied, or about two less than predicted. As this two-person shortfall is not statistically significant (regardless of the method used to compute the number of standard deviations of the difference or the threshold for statistical significance),⁹ the data fail to support Plaintiffs' allegation that African-Americans were significantly under-selected for Laborer positions at Ashland over the period 1/1/2000 - 12/31/2003.

As described in my May 25, 2005 report (May report), I measured African-American availability for Ashland Laborer jobs over the period 8/12/2001 - 12/31/2003 using the percent African-American among applicants of known race who had records in the Baker file (4.57% when one application per applicant is used). However, if I had assumed that 8.56% of the applicants of unknown race in the Baker file who applied during the period 8/12/2001 - 12/31/2003 are African-Americans and used this estimate along with the race data that are available for this time period, the estimated African-American availability rate would have been 6.30%, rather than the 4.57% representation rate that I used to prepare the analysis shown at Table 1.b in the May report.¹⁰ Given that

⁹ The binomial number of standard deviations of this difference is -0.62. If Dr. Bradley's preferred statistical method is used (the generalized binomial), the number of standard deviations of this difference is less than -0.65.

¹⁰ The fact that I have computed an Ashland benchmark assuming that 8.56% of applicants of unknown race are African-American should not be construed as my agreement that this is an appropriate estimate. In fact, because this representation rate is derived from a database that covers only part of the time period that Dr. Bradley studied and is flawed in several ways, I do not concur that this benchmark is valid.

115 Laborers were hired in Ashland during the period 8/12/2001 - 12/31/2003, if the African-American availability rate is 6.30%, then the statistical expectation is that approximately seven (7.2) of the selected applicants would be African-American. In fact, nine of these hires are African-American, or approximately two more than predicted. Therefore, even when Dr. Bradley's potentially inflated estimate of African-American representation among applicants of unknown race (8.56%) is used in the construction of the benchmark, the data fail to provide statistical support for the allegation that African-Americans were selected at lower rates than non-African-Americans during the relevant period. Furthermore, when the Ashland analysis described above is aggregated with the results of the Middletown analysis presented at Table 1.b of the May report, the 8/12/2001 - 12/31/2003 data show that the overall outcome of these hiring decisions is consistent with the result of a race-neutral process. As shown at Supplemental Table 1.b, the sum of the Ashland and Middletown differences between the actual and expected numbers of African-American hires is approximately eleven (-10.7), a -1.68 binomial standard deviation difference.¹¹

When the Ashland analysis described above is aggregated with the results of the Middletown analysis shown at Table 2.b in the May report, the data fail to provide statistical support for the allegation that AK Steel significantly under-selected African-Americans for Laborer jobs at the Middletown and Ashland Works over the period 8/12/2001 - 12/31/2003. As shown at Supplemental Table 2.b, the aggregated difference

Nevertheless, as discussed below, even when the 8.56% rate is used to estimate the number of African-Americans among applicants of unknown race, the data still fail to provide statistical support for the allegation that significantly fewer African-Americans were hired into Ashland Laborer jobs over the period 1/1/2000 - 12/31/2003 or 8/12/2000 - 12/31/2003.

¹¹ This difference is not statistically significant at the two standard deviation level even when Dr. Bradley's preferred statistical technique is applied (less than -1.77 standard deviations).

between the actual and expected numbers of African-American hires is -8.2, a -1.01 binomial standard deviation difference.^{12, 13}

The analyses described above were conducted using the Baker file which does *not* include applicants whose information appeared in the applicant log, but not in the Summation database. As explained above, the Baker file did not include records in the applicant log that were not also found in the Summation data because this information could not be verified and confirmation that these applications were for Laborer jobs could not be obtained. Nevertheless, as demonstrated below, if the applicant log is used in conjunction with the Baker file, then the data still fail to reveal a pattern of significant under-selection of African-American applicants for Ashland Laborer jobs.

When the applicant log and the Baker file are merged, there are 3,232 individuals who applied for a Laborer job during the period 1/1/2000 - 12/31/2003, 2,387 of whom are of known race. The African-American representation rate among those of known race is 4.02% (96 / 2,387). If the percent African-American among applicants of unknown race is estimated at 8.56%, then 72 of these 845 applicants are assumed to be African-American. If 168 (96 + 72) of the 3,232 applicants are African-American, then their representation rate is 5.20%.¹⁴ Given that 289 Ashland Laborers were hired over this three year period, using a 5.20% availability rate, the expected number of African-American hires is approximately 15 ($289 \times 0.0502 = 15.02$), or about three more than the actual number (12). As this shortfall is not statistically significant (regardless of the

¹² Even if the number of standard deviations of this difference is computed using Dr. Bradley's preferred statistical technique, this difference is not statistically significant (less than -1.12 standard deviations).

¹³ Analyses that include all applications submitted during the period 8/12/2001 - 12/31/2003 (rather than one application per applicant) and use the alternative Ashland African-American availability rate also fail to provide statistical evidence of a pattern of significantly under-hiring African-American applicants for Laborer jobs. See Supplemental Tables 1.a and 2.a.

¹⁴ The estimated benchmark is 5.20% when craft hires are excluded from the applicant pool. If the data for craft hires are included, then the proxy benchmark is 4.97%.

statistical technique applied or the threshold for statistical significance),¹⁵ an analysis that uses all of the available race data and a potentially inflated estimate of the percent African-American among applicants of unknown race reveals that the outcome of this hiring process is consistent with the race-neutral result.¹⁶

When the above method is used to measure African-American availability for Laborer jobs during the period 8/12/2002 - 12/31/2003, the estimated percent African-American is 6.79%. Given that 115 Ashland applicants were selected for Laborer jobs during this period, as shown at Supplemental Table 1.b*, the expected number of African-American hires is approximately eight (7.8), or about one less than the actual number (9). Clearly, this analysis which uses all of the available Ashland race data and a potentially inflated estimate of the percent African-American among applicants of unknown race, fails to provide any evidence whatsoever for the allegation that African-Americans were under-selected for Ashland Laborer jobs during this time period. Furthermore, as shown at Supplemental Tables 1.b* and 2.b*, when this Ashland analysis is aggregated with the results of the Middletown studies presented in the May report, the data fail to reveal a pattern of under-selecting African-Americans for Laborer jobs over the period 8/12/2001 - 12/31/2003.^{17, 18, 19}

¹⁵ The binomial number of standard deviations is -0.80. The generalized binomial number of standard deviations is less than -0.84.

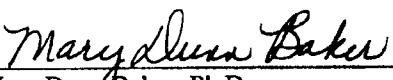
¹⁶ If craft hires are included in the applicant pool, then the expected number of African-American hires is approximately 14, or two more than the actual number. The binomial number of standard deviations of this shortfall of approximately two is -0.64. The generalized binomial number of standard deviations of this difference is less than -0.67.

¹⁷ The generalized binomial number of standard deviations of the Ashland, Middletown and aggregated differences shown at Supplemental Table 1.b* are less than 0.46, -2.27 and -1.85, respectively. The generalized binomial numbers of standard deviations of the Ashland, Middletown and aggregated differences shown at Supplemental Table 2.b* are less than 0.46, -1.44 and -1.19, respectively.

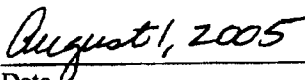
¹⁸ Supplemental Tables 1.a* and 2.a* provide the results of these same analyses including all applications rather than one application per person.

¹⁹ Analyses that include craft hires in the Laborer applicant pool yield similar results.

In summary, analyses of the racial composition of Ashland Laborer hires that use all of the available race data and even a potentially inflated African-American representation rate among applicants of unknown race (8.56%) illustrate that, regardless of the time period examined (1/1/2000 - 12/31/2003 or 8/12/2001 - 12/31/2003), the method used to compute the number of standard deviations and the threshold for statistical significance, the difference between the actual and expected numbers of African-American hires is not statistically significant.²⁰ The reason that Dr. Bradley's analysis of Ashland hires produces a statistically significant difference is that he chose to rely exclusively on the flawed applicant log and to ignore information for approximately 1,900 applicants of known race. As demonstrated above, if he had used all of the available race data, even if he assumed that 8.56% of applicants of unknown race are African-American, his analysis would show that the outcome of the Ashland hiring process is consistent with the race-neutral result.



Mary Dunn Baker, Ph.D.



Date

²⁰ Analyses that include craft hires in the applicant pool also reveal that African-Americans were selected for Ashland Laborer jobs in numbers consistent with the race-neutral outcome.

Supplemental Table 1.a
Analysis of the Racial Composition of Laborer Hires

All Applications Submitted August 12, 2001 - December 31, 2003

Location	Total Number of Applicants ¹	Number of African- American Applicants	Percent African- American Among Applicants ²	Total Number of Hires	Expected Number of African- American Hires	Actual Number of African- American Hires	Difference Between Actual and Expected	Binomial Number of Standard Deviations
Ashland ^{1,2}	1,901	119	6.26%	115	7.20	9	1.80	0.69
Middletown ³	4,084	364	8.91%	417	37.17	25	-12.17	-2.09
				532	44.37	34	-10.37	-1.63

Notes:

¹The Ashland analysis excludes 109 applicants who were hired into non-laborer positions and 45 duplicate applications.

² The percent African-American among Ashland applicants is estimated by dividing the sum of the number of African-American applicants of known race (49) and 8.56% of applicants of unknown race (70) by the total number of applicants.

³The Middletown analysis excludes 205 applicants of unknown race, 322 applicants who withdrew during the hiring process, and 175 duplicate applications.

Supplemental Table 1.a*
Analysis of the Racial Composition of Laborer Hires
All Applications Submitted August 12, 2001 - December 31, 2003

Location	Total Number of Applicants ¹	Number of African-American Applicants	Percent African-American Among Applicants ²	Total Number of Hires	Expected Number of African-American Hires	Actual Number of African-American Hires	Difference Between Actual and Expected	Binomial Number of Standard Deviations
Ashland ^{1,2}	2,020	135	6.68%	115	7.69	9	1.31	0.49
Middletown ³	4,084	364	8.91%	417	37.17	25	-12.17	-2.09
				532	44.85	34	-10.85	-1.69

Notes:

¹The Ashland analysis excludes 109 applicants who were hired into non-laborer positions and 45 duplicate applications.

² The percent African-American among Ashland applicants is estimated by dividing the sum of the number of African-American applicants of known race found on the Ashland Applicant Flow and Summation Databases (66) and 8.56% of applicants of unknown race (69) by the total number of applicants.

³The Middletown analysis excludes 205 applicants of unknown race, 322 applicants who withdrew during the hiring process, and 175 duplicate applications.

Supplemental Table 1.b
Analysis of the Racial Composition of Laborer Hires
Applications Submitted August 12, 2001 - December 31, 2003
One Application Per Applicant

Location	Total Number of Applicants ¹	Number of African- American Applicants	Percent African- American Among Applicants ²	Total Number of Hires	Expected Number of African- American Hires	Actual Number of African- American Hires	Difference Between Actual and Expected	Binomial Number of Standard Deviations
Ashland ^{1,2}	1,794	113	6.30%	115	7.24	9	1.76	0.67
Middletown ³	3,749	337	8.99%	417	37.48	25	-12.48	-2.14
				532	44.73	34	-10.73	-1.68

Notes:

¹The Ashland analysis excludes 109 applicants who were hired into non-laborer positions.

² The percent African-American among Ashland applicants is estimated by dividing the sum of the number of African-American applicants of known race (46) and 8.56% of applicants of unknown race (67) by the total number of applicants.

³The Middletown analysis excludes 205 applicants of unknown race and 284 applicants who withdrew during the hiring process.

Supplemental Table 1.b*
Analysis of the Racial Composition of Laborer Hires
Applications Submitted August 12, 2001 - December 31, 2003
One Application Per Applicant

Location	Total Number of Applicants ¹	Number of African-American Applicants	Percent African-American Among Applicants ²	Total Number of Hires	Expected Number of African-American Hires	Actual Number of African-American Hires	Difference Between Actual and Expected	Binomial Number of Standard Deviations
Ashland ^{1,2}	1,901	129	6.79%	115	7.80	9	1.20	0.44
Middletown ³	3,749	337	8.99%	417	37.48	25	-12.48	-2.14
				532	45.29	34	-11.29	-1.75

Notes:

¹The Ashland analysis excludes 109 applicants who were hired into non-laborer positions.

² The percent African-American among Ashland applicants is estimated by dividing the sum of the number of African-American applicants of known race found on the Ashland Applicant Flow and Summation Databases (63) and 8.56% of applicants of unknown race (66) by the total number of applicants.

³The Middletown analysis excludes 205 applicants of unknown race and 284 applicants who withdrew during the hiring process.

Supplemental Table 2.a
Analysis of the Racial Composition of
All Middletown Applications Referred for Background Check and Ashland Hires
All Applications Submitted August 12, 2001 - December 31, 2003

Location	Total Number of Applicants ¹	Number of African- American Applicants	Percent African- American Among Applicants ²	Total Number of Hires	Expected		Actual Number of African- American Hires	Difference Between Actual and Expected	Binomial Number of Standard Deviations
					Number of African- American Hires	Number of African- American Hires			
Ashland ^{1,2}	1,901	119	6.26%	115	7.20	9	1.80	0.69	
Middletown ³	4,125	367	8.90%	728	64.77	57	-7.77	-1.01	
				843	71.97	66	-5.97	-0.74	

Notes:

¹The Ashland analysis excludes 109 applicants who were hired into non-laborer positions and 45 duplicate applications.

² The percent African-American among Ashland applicants is estimated by dividing the sum of the number of African-American applicants of known race (49) and 8.56% of applicants of unknown race (70) by the total number of applicants.

³The Middletown analysis excludes 205 applicants of unknown race, 281 applications that were withdrawn prior to the background check and 175 duplicate applications.

Supplemental Table 2.a*
Analysis of the Racial Composition of
All Middletown Applications Referred for Background Check and Ashland Hires
All Applications Submitted August 12, 2001 - December 31, 2003

Location	Total Number of Applicants ¹	Number of African-American Applicants	Percent African-American Among Applicants ²	Total Number of Hires	Expected Number of African-American Hires	Actual Number of African-American Hires	Difference Between Actual and Expected	Binomial Number of Standard Deviations
Ashland ^{1,2}	2,020	135	6.68%	115	7.69	9	1.31	0.49
Middletown ³	4,125	367	8.90%	728	64.77	57	-7.77	-1.01
				843	72.46	66	-6.46	-0.79

Notes:

¹The Ashland analysis excludes 109 applicants who were hired into non-laborer positions and 45 duplicate applications.

²The percent African-American among Ashland applicants is estimated by dividing the sum of the number of African-American applicants of known race found on the Ashland Applicant Flow and Summation Databases (66) and 8.56% of applicants of unknown race (69) by the total number of applicants.

³The Middletown analysis excludes 205 applicants of unknown race, 281 applications that were withdrawn prior to the background check and 175 duplicate applications.

Supplemental Table 2.b
Analysis of the Racial Composition of
Middletown Applications Referred for Background Check and Ashland Hires

Applications Submitted August 12, 2001 - December 31, 2003

One Application Per Applicant

Location	Total Number of Applicants ¹	Number of African-American Applicants	Percent African-American Among Applicants ²	Total Number Referred (Hired)	Expected Number of African-American Referred (Hired)	Actual Number of African-American Referred (Hired)	Difference Between Actual and Expected	Binomial Number of Standard Deviations
Ashland ^{1,2}	1,794	113	6.30%	115	7.24	9	1.76	0.67
Middletown ³	3,789	340	8.97%	724	64.97	55	-9.97	-1.30
				839	72.21	64	-8.21	-1.01

Notes:

¹The Ashland analysis excludes 109 applicants who were hired into non-laborer positions.

² The percent African-American among Ashland applicants is estimated by dividing the sum of the number of African-American applicants of known race (46) and 8.56% of applicants of unknown race (67) by the total number of applicants.

³The Middletown analysis excludes 205 applicants of unknown race and 250 applicants who withdrew during the hiring process.

Supplemental Table 2.b*
Analysis of the Racial Composition of
Middletown Applications Referred for Background Check and Ashland Hires

Applications Submitted August 12, 2001 - December 31, 2003

One Application Per Applicant

Location	Total Number of Applicants ¹	Number of African-American Applicants	Percent African-American Among Applicants ²	Total Number Referred (Hired)	Expected Number of African-American Referred (Hired)	Actual Number of African-American Referred (Hired)	Difference Between Actual and Expected	Binomial Number of Standard Deviations
Ashland ^{1,2}	1,901	129	6.79%	115	7.80	9	1.20	0.44
Middletown ³	3,789	340	8.97%	724	64.97	55	-9.97	-1.30
				839	72.77	64	-8.77	-1.08

Notes:

¹The Ashland analysis excludes 109 applicants who were hired into non-laborer positions.

² The percent African-American among Ashland applicants is estimated by dividing the sum of the number of African-American applicants of known race found on the Ashland Applicant Flow and Summation Databases (63) and 8.56% of applicants of unknown race (66) by the total number of applicants.

³The Middletown analysis excludes 205 applicants of unknown race and 250 applicants who withdrew during the hiring process.